

FIGURE 1

Staphylothermus marinus - F1-12LC

ATG TCT TTA AAC AAG CAC TCT TGG ATG GAT ATG ATA ATA TTT ATT CTC
 Met Ser Leu Asn Lys His Ser Trp Met Asp Met Ile Ile Phe Ile Leu

 AGC TTT TCT TTC CCA TTA ACA ATG ATC GCA TTA GCT ATC TCT ATG TCG
 Ser Phe Ser Phe Pro Leu Thr Met Ile Ala Leu Ala Ile Ser Met Ser

 TCA TGG TTT AAT ATA TGG AAT GCA TTA AGC GAT CTA GGA CAT GCT
 Ser Trp Phe Asn Ile Trp Asn Asn Ala Leu Ser Asp Leu Gly His Ala

 GTT AAA AGC AGT GTT GCT CCA ATA TTC AAT CTA GGT CTT GCA ATT GGT
 Val Lys Ser Ser Val Ala Pro Ile Phe Asn Leu Gly Leu Ala Ile Gly

 GGG ATA CTA ATT GTT ATA GTT GGT TTA AGA AAT CTT TAT TCG TGG AGT
 Gly Ile Leu Ile Val Ile Val Gly Leu Arg Asn Leu Tyr Ser Trp Ser

 AGA GTT AAA GGA TCT TTA ATC ATA TCC ATG GGT GTA TTT CTT AAC TTA
 Arg Val Lys Gly Ser Leu Ile Ile Ser Met Gly Val Phe Leu Asn Leu
 ATA GGG GTT TTC GAC GAA GTA TAT GGT TGG ATA CAT TTC CTA GTC TCA
 Ile Gly Val Phe Asp Glu Val Tyr Gly Trp Ile His Phe Leu Val Ser

 GTA TTG TTT TTC TTA TCA ATA ATA GCA TAT TTC ATA GCT ATA TCA ATA
 Val Leu Phe Phe Leu Ser Ile Ile Ala Tyr Phe Ile Ala Ile Ser Ile

 CTT GAC AAA TCA TGG ATA GCT GTT CTA CTA ATA ATA GGT CAT ATT GCA
 Leu Asp Lys Ser Trp Ile Ala Val Leu Leu Ile Ile Gly His Ile Ala

 ATG TGG TAT CTA CAC TTT GCT TCA GAG ATT CCG AGA GGT GCG GCT ATT
 Met Trp Tyr Leu His Phe Ala Ser Glu Ile Pro Arg Gly Ala Ala Ile
 CCC GAG TTA TTA GCG GTA TTC TCG TTT TTA CCA TTC TAT ATA AGA GAC
 Pro Glu Leu Leu Ala Val Phe Ser Phe Leu Pro Phe Tyr Ile Arg Asp
 TAT TTT AAA TCA TAC ACT AAA CGA TAG
 Tyr Phe Lys Ser Tyr Thr Lys Arg

FIGURE 2***Pyrodictium* - TAG11-17LC**

ATG AAA CTC CTT GAG CCC ACA AAT ACC TCC TAC ACG CTG TTA CAG GAT
 Met Lys Leu Leu Glu Pro Thr Asn Thr Ser Tyr Thr Leu Leu Gln Asp

 TTA GCA TTG CAT TTT GCA TTT TAC TGG TTT CTG GCC GTG TAT ACG TGG
 Leu Ala Leu His Phe Ala Phe Tyr Trp Phe Leu Ala Val Tyr Thr Trp

 TTA CCC GGT GTC CTA GTC CGG GGC GTA GCT GTG GAC ACA GGG GTG GCT
 Leu Pro Gly Val Leu Val Arg Gly Val Ala Val Asp Thr Gly Val Ala

 CGG GTG CCT GGG CTC GGC CGG CGC GGT AAG AGG CTG CTC CTG GCC GCT
 Arg Val Pro Gly Leu Gly Arg Arg Gly Lys Arg Leu Leu Ala Ala

 GTG GCT GTC TTG GCG CTT GTT GTG TCC GTT GTT GTC CCG GCT TAT GTG
 Val Ala Val Leu Ala Leu Val Val Ser Val Val Val Pro Ala Tyr Val

 GCG TAT AGT AGT CTG CAC CCG GAG AGC TGT CGG CCC GTT GCG CCG GAG
 Ala Tyr Ser Ser Leu His Pro Glu Ser Cys Arg Pro Val Ala Pro Glu

 GGG CTC ACC TAC AAA GAG TTC AGC GTG ACC GCG GAG GAT GGC TTG GTG
 Gly Leu Thr Tyr Lys Glu Phe Ser Val Thr Ala Glu Asp Gly Leu Val

 GTT CCG GGC TGG GTG CTG GGC CCC GGC GCT GGG GGC AAC CCG GTG TTC
 Val Arg Gly Trp Val Leu Gly Pro Gly Ala Gly Gly Asn Pro Val Phe

 GTT TTG ATG CAC GGG TAT ACT GGG TGC CGC TCG GCG CCC TAC ATG GCT
 Val Leu Met His Gly Thr Gly Cys Arg Ser Ala Pro Tyr Met Ala

 GTG CTG GCC CGG GAG CTC GTG GAG TGG GGG TAC CCG GTG GTT GTG TTC
 Val Leu Ala Arg Glu Leu Val Glu Trp Gly Tyr Pro Val Val Val Phe

 GAC TTC CGG GGC CAC GGG GAG AGC GGG GGC TCG ACG ACG ATT GGG CCC
 Asp Phe Arg Gly His Gly Glu Ser Gly Ser Thr Thr Ile Gly Pro

 CGG GAG GTG CTG GAT GCC CGG GCT GTG GTG GGC TAT GTC TCG GAG CGG
 Arg Glu Val Leu Asp Ala Arg Ala Val Val Gly Tyr Val Ser Glu Arg

 TTC CCC GGC CGC CGG ATA ATA TTG GTG GGG TTC AGT ATG GGC GGC GCT
 Phe Pro Gly Arg Arg Ile Ile Leu Val Gly Phe Ser Met Gly Gly Ala

 GTA GCG ATC GTG GAG GGT GCT GGG GAC CCG CGG GTC TAC GCG GTG GCT
 Val Ala Ile Val Glu Gly Ala Gly Asp Pro Arg Val Tyr Ala Val Ala

 GCT GAT AGC CCG TAC TAT AGG CTC CGG GAC GTC ATA CCC CGG TGG CTG
 Ala Asp Ser Pro Tyr Tyr Arg Leu Arg Asp Val Ile Pro Arg Trp Leu

 GAG TAC AAG ACG CCG CTG CCG GGC TGG GTG GGT GTG CTG GCC GGG TTC

Glu Tyr Lys Thr Pro Leu Pro Gly Trp Val Gly Val Leu Ala Gly Phe

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TAC GGG AGG CTG ATG GCG GGC GTT GAC CTC GGC TTC GGC CCC GCT GGG
Tyr Gly Arg Leu Met Ala Gly Val Asp Leu Gly Phe Gly Pro Ala Gly

GTG GAG CGC GTG GAT AAG CCG TTG CTG GTG GTG TAT GGG CCC CGG GAC
Val Glu Arg Val Asp Lys Pro Leu Leu Val Val Tyr Gly Pro Arg Asp

CCG CTG GTG ACG CGG GAC GAG GCG AGG AGC CTG GCG TCC CGT AGC CCG
Pro Leu Val Thr Arg Asp Glu Ala Arg Ser Leu Ala Ser Arg Ser Pro

TGT GGC CGT CTC GTC GAG GTT CCT GGG GCT GGC CAC GTG GAG GCC GTG
Cys Gly Arg Leu Val Glu Val Pro Gly Ala Gly His Val Glu Ala Val

GAT GTG CTC GGG CCG GGC CGC TAC GCA GAC ATG CTG ATA GAG CTG GCG
Asp Val Leu Gly Pro Gly Arg Tyr Ala Asp Met Leu Ile Glu Leu Ala

CAC GAG GAG TGC CCT CCG GGG GCC GGT GGC TGA
His Glu Glu Cys Pro Pro Gly Ala Gly Gly

FIGURE 3***Archaeoglobus Venificus SN P6-24LC***

ATG CCA TAT GTT AGG AAT GGT GGT GTA AAT ATC TAT TAT GAA CTG GTG
 Met Pro Tyr Val Arg Asn Gly Gly Val Asn Ile Tyr Tyr Glu Leu Val

 GAT GGA CCT GAG CCA CCA ATT GTC TTT GTT CAC GGA TGG ACA GCA AAT
 Asp Gly Pro Glu Pro Pro Ile Val Phe Val His Gly Trp Thr Ala Asn

 ATG AAT TTT TGG AAA GAG CAA AGA CGT TAT TTT GCA GGC AGG AAT ATG
 Met Asn Phe Trp Lys Glu Gln Arg Arg Tyr Phe Ala Gly Arg Asn Met

 ATG TTG TTT GTC GAT AAC AGA GGT CAT GGC AGG TCC GAT AAG CCA CTT
 Met Leu Phe Val Asp Asn Arg Gly His Gly Arg Ser Asp Lys Pro Leu

 GGA TAC GAT TTC TAC AGA TTT GAG AAC TTC ATT TCA GAT TTA GAT GCG
 Gly Tyr Asp Phe Tyr Arg Phe Glu Asn Phe Ile Ser Asp Leu Asp Ala

 GTT GTT AGG GAG ACT GGA GTG GAG AAA TTT GTT CTC GTC GGA CAT TCA
 Val Val Arg Glu Thr Gly Val Glu Lys Phe Val Leu Val Gly His Ser

 TTC GGA ACA ATG ATC TCT ATG AAG TAC TGT TCG GAG TAT CGG AAT CGG
 Phe Gly Thr Met Ile Ser Met Lys Tyr Cys Ser Glu Tyr Arg Asn Arg

 GTT CTT GCT CTA ATC CTC ATA GGT GGT GGG AGC AGA ATA AAG CTT CTA
 Val Leu Ala Leu Ile Leu Ile Gly Gly Ser Arg Ile Lys Leu Leu

 CAC AGA ATT GGA TAT CCT TTA GCA AAG ATT CTT GCA TCC ATT GCA TAC
 His Arg Ile Gly Tyr Pro Leu Ala Lys Ile Leu Ala Ser Ile Ala Tyr

 AAG AAG TCT TCA AGA TTG GTC GCA GAT CTT TCC TTT GGC AAA AAT GCT
 Lys Lys Ser Ser Arg Leu Val Ala Asp Leu Ser Phe Gly Lys Asn Ala

 GGT GAA CTT AAA GAG TGG GGA TGG AAA CAG GCA ATG GAT TAT ACA CCC
 Gly Glu Leu Lys Glu Trp Gly Trp Lys Gln Ala Met Asp Tyr Thr Pro

 TCC TAC GTG GCA ATG TAC ACG TAC AGA ACT CTA ACG AAA GTG AAT CTT
 Ser Tyr Val Ala Met Tyr Thr Tyr Arg Thr Leu Thr Lys Val Asn Leu

 GAA AAT ATC TTG GAG AAA ATA GAC TGT CCA ACA CTG ATT ATC GTT GGA
 Glu Asn Ile Leu Glu Lys Ile Asp Cys Pro Thr Leu Ile Ile Val Gly

 GAA GAG GAT GCA CTA TTG CCC GTT AGC AAA TCA GTT GAG CTG AGC AGG
 Glu Glu Asp Ala Leu Leu Pro Val Ser Lys Ser Val Glu Leu Ser Arg

 AGG ATA GAA AAC TCA AAG CTT GTG ATC ATC CCA AAC TCG GGG CAT TGC
 Arg Ile Glu Asn Ser Lys Leu Val Ile Ile Pro Asn Ser Gly His Cys

 GTA ATG CTT GAG AGT CCA AGT GAG GTT AAT AGA GCA ATG GAC GAA TTC

Val Met Leu Glu Ser Pro Ser Glu Val Asn Arg Ala Met Asp Glu Phe

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ATT TCT TCA GCA CAG TTC TAA
Ile Ser Ser Ala Gln Phe

FIGURE 4

Aquifex pyrophilus - 28LC

TTG AGA TTG AGG AAA TTT GAA GAG ATA AAC CTC GTT CTT TCG GGA GGA
Leu Arg Leu Arg Lys Phe Glu Glu Ile Asn Leu Val Leu Ser Gly Gly

GCT GCA AAG GGC ATA GCC CAC ATA GGT GTT TTG AAA GCT ATA AAC GAG
Ala Ala Lys Gly Ile Ala His Ile Gly Val Leu Lys Ala Ile Asn Glu

CTC GGT ATA AGG GTG AGG GCT TTA AGC GGG GTG AGC GCC GGG GCA ATC
Leu Gly Ile Arg Val Arg Ala Leu Ser Gly Val Ser Ala Gly Ala Ile

GTT TCG GTC TTT TAT GCC TCA GGC TAC TCC CCT GAA GGG ATG TTC AGC
Val Ser Val Phe Tyr Ala Ser Gly Tyr Ser Pro Glu Gly Met Phe Ser

CTT CTG AAG AGG GTA AAC TGG CTG AAG CTG TTT AAG TTC AAG CCA CCT
Leu Leu Lys Arg Val Asn Trp Leu Lys Leu Phe Lys Phe Lys Pro Pro

CTG AAG GGA TTG ATA GGG TGG GAG AAG GCT ATA AGA TTC CTT GAG GAA
Leu Lys Gly Leu Ile Gly Trp Glu Lys Ala Ile Arg Phe Leu Glu Glu

GTT CTC CCT TAC AGG AGA ATA GAA AAA CTT GAG ATA CCG ACG TAT ATA
Val Leu Pro Tyr Arg Arg Ile Glu Lys Leu Glu Ile Pro Thr Tyr Ile

TGC GCG ACG GAT TTA TAC TCG GGA AGG GCT CTA TAC CTC TCG GAA GGG
Cys Ala Thr Asp Leu Tyr Ser Gly Arg Ala Leu Tyr Leu Ser Glu Gly

AGT TTA ATC CCC GCA CTT CTC GGC AGC TGT GCA ATT CCC GGC ATA TTT
Ser Leu Ile Pro Ala Leu Leu Gly Ser Cys Ala Ile Pro Gly Ile Phe

GAA CCC GTT GAG TAT AAG AAT TAC TTG CTC GTT GAC GGA GGT ATA GTT
Glu Pro Val Glu Tyr Lys Asn Tyr Leu Leu Val Asp Gly Gly Ile Val

AAC AAC CTT CCC GTT GAG CCC TTT CAG GAA AGC GGT ATT CCC ACC GTT
Asn Asn Leu Pro Val Glu Pro Phe Gln Glu Ser Gly Ile Pro Thr Val

TGC GTT GAT GTC CTT CCC ATA GAG CCG GAA AAG GAT ATA AAG AAC ATT
Cys Val Asp Val Leu Pro Ile Glu Pro Glu Lys Asp Ile Lys Asn Ile

CTT CAC ATC CTT TTG AGG AGC TTC TTT CTT GCG GTC CGC TCA AAC TCC
Leu His Ile Leu Leu Arg Ser Phe Phe Leu Ala Val Arg Ser Asn Ser

GAA AAG AGA AAG GAG TTT TGT GAC CTC GTT ATA GTT CCT GAG CTT GAG
Glu Lys Arg Lys Glu Phe Cys Asp Leu Val Ile Val Pro Glu Leu Glu

GAG TTC ACA CCC CTT GAT GTT AGA AAA GCG GAC CAA ATA ATG GAG AGG
Glu Phe Thr Pro Leu Asp Val Arg Lys Ala Asp Gln Ile Met Glu Arg

GGA TAC ATA AAG GCC TTA GAG GTA CTT TCT GAA TAG
Gly Tyr Ile Lys Ala Leu Glu Val Leu Ser Glu

கு வெள்ளு வெள்ளு = வெள்ளு வெள்ளு வெள்ளு

FIGURE 5**M11TL-29L.**

ATG TTT AAT ATC AAT GTC TTT GTT AAT ATA TCT TGG CTG TAT TTT TCA
 Met Phe Asn Ile Asn Val Phe Val Asn Ile Ser Trp Leu Tyr Phe Ser

 GGG ATA GTT ATG AAG ACT GTG GAA GAG TAT GCG CTA CTT GAA ACA GGC
 Gly Ile Val Met Lys Thr Val Glu Glu Tyr Ala Leu Leu Glu Thr Gly

 GTA AGA GTG TTT TAT CGG TGT GTA ATC CCG GAG AAA GCT TTT AAC ACT
 Val Arg Val Phe Tyr Arg Cys Val Ile Pro Glu Lys Ala Phe Asn Thr

 TTG ATA ATA GGT TCA CAC GGA TTG GGG GCG CAC AGT GGA ATC TAC ATT
 Leu Ile Ile Gly Ser His Gly Leu Gly Ala His Ser Gly Ile Tyr Ile

 AGT GTT GCT GAA GAA TTT GCT AGG CAC GGA TTT GGA TTC TGC ATG CAC
 Ser Val Ala Glu Glu Phe Ala Arg His Gly Phe Gly Phe Cys Met His

 GAT CAA AGG GGA CAT GGG AGA ACG GCA AGC GAT AGA GAA AGA GGG TAT
 Asp Gln Arg Gly His Gly Arg Thr Ala Ser Asp Arg Glu Arg Gly Tyr

 GTG GAG GGC TTT CAC AAC TTC ATA GAG GAT ATG AAG GCC TTC TCC GAT
 Val Glu Gly Phe His Asn Phe Ile Glu Asp Met Lys Ala Phe Ser Asp

 TAT GCC AAG TGG CGC GTG GGA GGT GAC GAA ATA ATA TTG CTA GGA CAC
 Tyr Ala Lys Trp Arg Val Gly Gly Asp Glu Ile Ile Leu Leu Gly His

 AGT ATG GGC GGG CTG ATA GCG CTC TTA ACA GTT GCA ACT TAT AAA GAA
 Ser Met Gly Gly Leu Ile Ala Leu Leu Thr Val Ala Thr Tyr Lys Glu

 ATC GCC AAG GGA GTT ATC GCG CTA GCC CCG GCC CTC CAA ATC CCC TTA
 Ile Ala Lys Gly Val Ile Ala Leu Ala Pro Ala Leu Gln Ile Pro Leu

 ACC CCG GCT AGA AGA CTT GTT CTA AGC CTC GCG TCA AGG CTT GCC CCG
 Thr Pro Ala Arg Arg Leu Val Leu Ser Leu Ala Ser Arg Leu Ala Pro

 CAT TCT AAG ATC ACC TTA CAA AGG AGA TTG CCG CAG AAA CCA GAG GGT
 His Ser Lys Ile Thr Leu Gln Arg Arg Leu Pro Gln Lys Pro Glu Gly

 TTT CAA AGA GCA AAA GAT ATA GAA TAC AGT CTG AGT GAA ATA TCA GTC
 Phe Gln Arg Ala Lys Asp Ile Glu Tyr Ser Leu Ser Glu Ile Ser Val

 AAG CTC GTG GAC GAA ATG ATT AAA GCA TCA TCT ATG TTC TGG ACC ATA
 Lys Leu Val Asp Glu Met Ile Lys Ala Ser Ser Met Phe Trp Thr Ile

 GCA GGG GAA ATT AAT ACT CCC GTC CTG CTT ATT CAT GGG GAA AAA GAC
 Ala Gly Glu Ile Asn Thr Pro Val Leu Leu Ile His Gly Glu Lys Asp

AAT GTC ATA CCT CCG GAG GCG AGC AAA AAA GCC TAC CAA TTA ATA CCT
Asn Val Ile Pro Pro Glu Ala Ser Lys Lys Ala Tyr Gln Leu Ile Pro

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TCA TTC CCT AAA GAG TTG AAA ATA TAC CCC GAT CTT GGA CAC AAC TTG
 Ser Phe Pro Lys Glu Leu Lys Ile Tyr Pro Asp Leu Gly His Asn Leu

TTT TTT GAA CCA GGC GCG GTG AAA ATC GTC ACA GAC ATT GTA GAG TGG
 Phe Phe Glu Pro Gly Ala Val Lys Ile Val Thr Asp Ile Val Glu Trp

GTT AAG AAT CTA CCC AGG GAA AAT CCT TAA
Val Lys Asn Leu Pro Arg Glu Asn Pro

FIGURE 6

Thermococcus CL-2-30LC

ATG GAG GTT TAC AAG GCC AAA TTC GGC GAA GCA AAG CTC GGC TGG GTC
 Met Glu Val Tyr Lys Ala Lys Phe Gly Glu Ala Lys Leu Gly Trp Val

 GTT CTG GTT CAT GGC CTC GGC GAG CAC AGC GGA AGG TAT GGA AGA CTG
 Val Leu Val His Gly Leu Gly Glu His Ser Gly Arg Tyr Gly Arg Leu

 ATT AAG GAA CTC AAC TAT GCC GGC TTT GGA GTT TAC ACC TTC GAC TGG
 Ile Lys Glu Leu Asn Tyr Ala Gly Phe Gly Val Tyr Thr Phe Asp Trp

 CCC GGC CAC GGG AAG AGC CCG GGC AAG AGA GGG CAC ACG AGC GTC GAG
 Pro Gly His Gly Lys Ser Pro Gly Lys Arg Gly His Thr Ser Val Glu

 GAG GCG ATG GAA ATC ATC GAC TCG ATA ATC GAG GAG ATC AGG GAG AAG
 Glu Ala Met Glu Ile Ile Asp Ser Ile Ile Glu Glu Ile Arg Glu Lys

 CCC TTC CTC TTC GGC CAC AGC CTC GGT GGT CTA ACT GTC ATC AGG TAC
 Pro Phe Leu Phe Gly His Ser Leu Gly Leu Thr Val Ile Arg Tyr

 GCT GAG ACG CGG CCC GAT AAA ATA CGG GGA TTA ATA GCT TCC TCG CCT
 Ala Glu Thr Arg Pro Asp Lys Ile Arg Gly Leu Ile Ala Ser Ser Pro

 GCC CTC GCC AAG AGC CCG GAA ACG CCG GGC TTC ATG GTG GCC CTC GCG
 Ala Leu Ala Lys Ser Pro Glu Thr Pro Gly Phe Met Val Ala Leu Ala

 AAG TTC CTT GGA AAG ATC GCC CCG GGA GTT GTT CTC TCC AAC GGC ATA
 Lys Phe Leu Gly Lys Ile Ala Pro Gly Val Val Leu Ser Asn Gly Ile

 AAG CCG GAA CTC CTC TCG AGG AAC AGG GAC GCC GTG AGG AGG TAC GTT
 Lys Pro Glu Leu Leu Ser Arg Asn Arg Asp Ala Val Arg Arg Tyr Val

 GAA GAC CCA CTC GTC CAC GAC AGG ATT TCG GCC AAG CTG GGA AGG AGC
 Glu Asp Pro Leu Val His Asp Arg Ile Ser Ala Lys Leu Gly Arg Ser

 ATC TTC GTG AAC ATG GAG CTG GCC CAC AGG GAG GCG GAC AAG ATA AAA
 Ile Phe Val Asn Met Glu Leu Ala His Arg Glu Ala Asp Lys Ile Lys

 GTC CCG ATC CTC CTT CTG ATC GGC ACT GGC GAT GTA ATA ACC CCG CCT
 Val Pro Ile Leu Leu Ile Gly Thr Gly Asp Val Ile Thr Pro Pro

 GAA GGC TCA CGC AGA CTC TTC GAG GAG CTG GCC GTC GAG AAC AAA ACC
 Glu Gly Ser Arg Arg Leu Phe Glu Glu Leu Ala Val Glu Asn Lys Thr

 CTG AGG GAG TTC GAG GGG GCG TAC CAC GAG ATA TTT GAA GAC CCC GAG
 Leu Arg Glu Phe Glu Gly Ala Tyr His Glu Ile Phe Glu Asp Pro Glu

TGG GCC GAG GAG TTC CAC GAA ACA ATT GTT AAG TGG CTG GTT GAA AAA
Trp Ala Glu Glu Phe His Glu Thr Ile Val Lys Trp Leu Val Glu Lys

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TCG TAC TCT TCG GCT CAA TAA
Ser Tyr Ser Ser Ala Gln

FIGURE 7

Aquifex VF5-34LC

TTG ATT GGC AAT TTG AAA TTG AAG AGG TTT GAA GAG GTT AAC TTA GTT
 Leu Ile Gly Asn Leu Lys Leu Lys Arg Phe Glu Glu Val Asn Leu Val

 CTT TCG GGA GGG GCT GCC AAG GGT ATC GCC CAT ATA GGT GTT TTA AAA
 Leu Ser Gly Gly Ala Ala Lys Gly Ile Ala His Ile Gly Val Leu Lys

 GCT CTG GAA GAG CTC GGT ATA AAG GTA AAG AGG CTC AGC GGG GTA AGT
 Ala Leu Glu Leu Gly Ile Lys Val Lys Arg Leu Ser Gly Val Ser

 GCT GGA GCT ATC GTT TCC GTC TTT TAC GCT TCG GGC TAC ACT CCC GAC
 Ala Gly Ala Ile Val Ser Val Phe Tyr Ala Ser Gly Tyr Thr Pro Asp

 GAG ATG TTA AAA CTC CTG AAA GAG GTA AAC TGG CTC AAA CTT TTT AAG
 Glu Met Leu Lys Leu Lys Glu Val Asn Trp Leu Lys Leu Phe Lys

 TTC AAA ACA CCG AAA ATG GGC TTA ATG GGG TGG GAG AAG GCT GCA GAG
 Phe Lys Thr Pro Lys Met Gly Leu Met Gly Trp Glu Lys Ala Ala Glu

 TTT TTG GAA AAA GAG CTC GGA GTT AAG AGG CTG GAA GAC CTG AAC ATA
 Phe Leu Glu Lys Glu Leu Gly Val Lys Arg Leu Glu Asp Leu Asn Ile

 CCA ACC TAT CTT TGC TCG GCG GAT CTG TAC ACG GGA AAG GCT CTT TAC
 Pro Thr Tyr Leu Cys Ser Ala Asp Leu Tyr Thr Gly Lys Ala Leu Tyr

 TTC GGC AGA GGT GAC TTA ATT CCC GTG CTT CTC GGA AGT TGT TCC ATA
 Phe Gly Arg Gly Asp Leu Ile Pro Val Leu Leu Gly Ser Cys Ser Ile

 CCC GGG ATT TTT GAA CCA GTT GAG TAC GAG AAT TTT CTA CTT GTT GAC
 Pro Gly Ile Phe Glu Pro Val Glu Tyr Glu Asn Phe Leu Leu Val Asp

 GGA GGT ATA GTG AAC AAC CTG CCC GTA GAA CCT TTG GAA AAG TTC AAA
 Gly Gly Ile Val Asn Asn Leu Pro Val Glu Pro Leu Glu Lys Phe Lys

 GAA CCC ATA ATC GGG GTA GAT GTG CTT CCC ATA ACT CAA GAA AGA AAG
 Glu Pro Ile Ile Gly Val Asp Val Leu Pro Ile Thr Gln Glu Arg Lys

 ATT AAA AAT ATA CTC CAC ATC CTT ATA AGG AGC TTC TTT CTG GCG GTT
 Ile Lys Asn Ile Leu His Ile Leu Ile Arg Ser Phe Phe Leu Ala Val

 CGT TCC AAT TCG GAA AAG AGA AAG GAG TTC TGC AAC GTA GTT ATA GAA
 Arg Ser Asn Ser Glu Lys Arg Lys Glu Phe Cys Asn Val Val Ile Glu

 CCT CCC CTT GAA GAG TTC TCT CCT CTG GAC GTA AAT AAG GCG GAC GAG
 Pro Pro Leu Glu Glu Phe Ser Pro Leu Asp Val Asn Lys Ala Asp Glu

ATA TTC TGC GGG GAT ATG AGA GCA CTT TAA
Ile Phe Cys Gly Asp Met Arg Ala Leu

ବିଜ୍ଞାନ ଏତିହାସିକ ପରିମାଣ କରିବାର ପାଇଁ

FIGURE 8**Teredinibacter - 42L**

ATG CCA GCT AAT GAC TCA CCC ACG ATC GAC TTT AAT CCT CGC GGC ATT
 Met Pro Ala Asn Asp Ser Pro Thr Ile Asp Phe Asn Pro Arg Gly Ile

 CTT CGC AAC GCT CAC GCA CAG GTT ATT TTA GCG ACT TCC GGC TTG CGC
 Leu Arg Asn Ala His Ala Gln Val Ile Leu Ala Thr Ser Gly Leu Arg

 AAA GCG TTT TTG AAA CGC ACG CAC AAG AGC TAC CTC AGC ACT GCC CAA
 Lys Ala Phe Leu Lys Arg Thr His Lys Ser Tyr Leu Ser Thr Ala Gln

 TGG CTG GAG CTC GAT GCC GGC AAC GGA GTT ACC TTG GCC GGA GAG CTT
 Trp Leu Glu Leu Asp Ala Gly Asn Gly Val Thr Leu Ala Gly Glu Leu

 AAC ACA GCG CCT GCA ACT GCA TCC TCC CAC CCG GCG CAC AAG AAC
 Asn Thr Ala Pro Ala Thr Ala Ser Ser His Pro Ala His Lys Asn

 ACT CTG GTT ATT GTG CTG CAC GGC TGG GAA GGC TCC AGC CAG TCG GCC
 Thr Leu Val Ile Val Leu His Gly Trp Glu Gly Ser Ser Gln Ser Ala

 TAT GCG ACC TCC GCT GGC AGC ACG CTT TTC GAC AAT GGG TTC GAC ACT
 Tyr Ala Thr Ser Ala Gly Ser Thr Leu Phe Asn Gly Phe Asp Thr

 TTT CGC CTT AAT TTT CGC GAT CAC GGC GAC ACC TAC CAC TTA AAC CGC
 Phe Arg Leu Asn Phe Arg Asp His Gly Asp Thr Tyr His Leu Asn Arg

 GGC ATA TTT AAC TCA TCG CTG ATT GAC GAA GTA GTG GGC GCA GTC AAA
 Gly Ile Phe Asn Ser Ser Leu Ile Asp Glu Val Val Gly Ala Val Lys

 GCC ATC CAG CAG CAA ACC GAC TAC GAC AAG TAT TGC CTG ATG GGG TTC
 Ala Ile Gln Gln Gln Thr Asp Tyr Asp Lys Tyr Cys Leu Met Gly Phe

 TCA CTG GGT GGG AAC TTT GCC TTG CGC GTC GCG GTG CGG GAA CAG CAT
 Ser Leu Gly Gly Asn Phe Ala Leu Arg Val Ala Val Arg Glu Gln His

 CTC GCT AAA CCG CTA GCG GGC GTG CTC GCC GTA TGC CCG GTA CTC GAC
 Leu Ala Lys Pro Leu Ala Gly Val Leu Ala Val Cys Pro Val Leu Asp

 CCC GCA CAC ACC ATG ATG GCC CTA AAC CGA GGT GCG TTT TTC TAC GGC
 Pro Ala His Thr Met Met Ala Leu Asn Arg Gly Ala Phe Phe Tyr Gly

 CGC TAT TTT GCG CAT AAA TGG AAG CGC TCG TTA ACC GCA AAA CTT GCA
 Arg Tyr Phe Ala His Lys Trp Lys Arg Ser Leu Thr Ala Lys Leu Ala

 GCT TTC CCA GAC TAC AAA TAC GGC AAA GAT TTA AAA TCG ATA CAC ACG
 Ala Phe Pro Asp Tyr Lys Tyr Gly Lys Asp Leu Lys Ser Ile His Thr

CTT GAT GAG TTA AAC AAC TAT TTC ATT CCC CGC TAC ACC GGC TTC AAC
Leu Asp Glu Leu Asn Asn Tyr Phe Ile Pro Arg Tyr Thr Gly Phe Asn
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TCA GTC TCC GAA TAC TTC AAA AGT TAC ACG CTC ACC GGG CAG AAG CTC
Ser Val Ser Glu Tyr Phe Lys Ser Tyr Thr Leu Thr Gly Gln Lys Leu

GCG TTT CTC AAC TGC CCC AGT TAC ATT CTG GCA GCT GGC GAC GAC CCA
Ala Phe Leu Asn Cys Pro Ser Tyr Ile Leu Ala Ala Gly Asp Asp Pro

ATA ATT CCA GCA TCC GAC TTT CAG AAA ATA GCC AAG CCT GCG AAT CTG
Ile Ile Pro Ala Ser Asp Phe Gln Lys Ile Ala Lys Pro Ala Asn Leu

CAC ATA ACA GTA ACG CAA CAA GGT TCT CAT TGC GCA TAC CTG GAA AAC
His Ile Thr Val Thr Gln Gln Gly Ser His Cys Ala Tyr Leu Glu Asn

CTG CAT AAA CCT AGT GCT GCC GAC AAA TAT GCG GTG AAA TTA TTT GGA
Leu His Lys Pro Ser Ala Ala Asp Lys Tyr Ala Val Lys Leu Phe Gly

GCC TGT TGA
Ala Cys

FIGURE 9***Archeoglobus fulgidus* VC16 - 16MC1**

ATG CTT GAT ATG CCA ATC GAC CCT GTT TAC TAC CAG CTT GCT GAG TAT
 Met Leu Asp Met Pro Ile Asp Pro Val Tyr Tyr Gln Leu Ala Glu Tyr

 TTC GAC AGT CTG CCG AAG TTC GAC CAG TTT TCC TCG GCC AGA GAG TAC
 Phe Asp Ser Leu Pro Lys Phe Asp Gln Phe Ser Ser Ala Arg Glu Tyr

 AGG GAG GCG ATA AAT CGA ATA TAC GAG GAG AGA AAC CGG CAG CTG AGC
 Arg Glu Ala Ile Asn Arg Ile Tyr Glu Glu Arg Asn Arg Gln Leu Ser

 CAG CAT GAG AGG GTT GAA AGA GTT GAG GAC AGG ACG ATT AAG GGG AGG
 Gln His Glu Arg Val Glu Arg Val Glu Asp Arg Thr Ile Lys Gly Arg

 AAC GGA GAC ATC AGA GTC AGA GTT TAC CAG CAG AAG CCC GAT TCC CCG
 Asn Gly Asp Ile Arg Val Arg Val Tyr Gln Gln Lys Pro Asp Ser Pro

 GGT CTG GTT TAC TAT CAC GGT GGA TTT GTG ATT TGC AGC ATC GAG
 Val Leu Val Tyr Tyr His Gly Gly Phe Val Ile Cys Ser Ile Glu

 TCG CAC GAC GCC TTA TGC AGG AGA AYY GCG AGA CTT TCA AAC TCT ACC
 Ser HIS Asp Ala Leu Cys Arg ARg Ile Ala Arg Leu Ser Asn Ser Thr

 GTA GTC TCC GTG GAT TAC AGG CTC GCT CCT GAG CAC AAG TTT CCC CCC
 Val Val Ser Val Asp Tyr Arg Leu Ala Pro Glu His Lys Phe Pro Ala

 CCA GTT TAT CAT TGC TAC GAT GCG ACC AAG TGG GTT GCT GAG AAC CGG
 Ala Val Tyr Asp Cys Tyr Aso Ala Thr Lys Trp Val Ala Glu Asn Ala

 GAG GAG CTG AGG ATT GAC CCG TCA AAA ATC TTC GTT GGG GGG GAC AGT
 Glu Glu Leu Arg Ile Asp Pro Ser Lys Ile Phe Val Gly Gly Asp Ser

 GCG GGA CGG AAT CTT GCC CCG GCG CTT TCA ATA ATG GCG AGA GAC AGC
 Ala Gly Gly Asn Leu Ala Ala Val Ser Ile Met Ala Arg Asp Ser

 GGA GAA GAT TTC ATA AAG CAT CAA ATT CTA ACT TAC CCC GTT GTG AAC
 Gly Glu Asp Phe Ile Lys His Gln Ile Leu Ile Tyr Pro Val Val Asn

 TTT GTA GCC CCC ACA CCA TCG CTT CTG GAG TTT GGA GAG GGG CTG TGG
 Phe Val Ala Pro Thr Pro Ser Leu Leu Glu Phe GLy Glu Gly Leu Trp

 ATT CTC GAC CAG AAG ATA ATG AGT TGG TTC TCG GAG CAG TAC TTC TCC
 Ile Leu Asp Gln Lys Ile Met Ser Trp Phe Ser Glu Gln Tyr Phe Ser

 AGA GAG GAA GAT AAG TTC AAG CCC CTC GCC TCC GTA ATC TTT GCG GAC
 Arg Glu Glu Aso Lys Phe Asn Pro Leu Ala Ser Val Ile Phe Ala Asp

CTT GAG AAC CTA CCT CCT GCG CTG ATC ATA ACC GCC GAA TAC GAC CCG
 Leu Glu Asn Leu Pro Pro Ala Leu Ile Ile Thr Ala Glu Tyr Asp Pro

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CTG AGA GAT GAA GGA GAA GTT TTC GGG CAG ATG CTG AGA AGA GCC GGT
 Leu Arg Asp Glu Gly Glu Val Phe Gly Gln Met Leu Arg Arg Ala Gly

GTT GAG GCG AGC ATC GTC AGA TAC AGA GGC GTG CTT CAC GGA TTC ATC
 Val Glu Ala Ser Ile Val Arg Tyr Arg Gly Val Leu His Gly Phe Ile

AAT TAC TAT CCC GTG CTG AAG GCT GCG AGG GAT GCG ATA AAC CAG ATT
Asn Tyr Tyr Pro Val Leu Lys Ala Ala Arg Asp Ala Ile Asn Gln Ile

GCC GCT CTT CTT GTG TTC GAC TAG
Ala Ala Leu leu Val Phe Asp

FIGURE 10

Sulfolobus Solfataricus P1 - 8LC1

ATG CCC CTA GAT CCT AGA ATT AAA AAG TTA CTA GAA TCA GCT CTT ACT
 Met Pro Leu Asp Pro Arg Ile Lys Lys Leu Leu Glu Ser Ala Leu Thr

ATA CCA ATT GGT AAA GCC CCA GTA GAA GAG GTA AGA AAG ATA TTT AGG
 Ile Pro Ile Gly Lys Ala Pro Val Glu Glu Val Arg Lys Ile Phe Arg

CAA TTA GCG TCG GCA GCT CCC AAA GTC GAA GTT GGA AAA GTA GAA GAT
 Gln Leu Ala Ser Ala Ala Pro Lys Val Glu Val Gly Lys Val Glu Asp

ATA AAA ATA CCA GGC AGT GAA ACC GTT ATA AAC GCT AGA GTG TAT TTT
 Ile Lys Ile Pro Gly Ser Glu Thr Val Ile Asn Ala Arg Val Tyr Phe

CCG AAG AGT AGC GGT CCT TAT GGT GTT CTA GTG TAT CTT CAT GGA GGC
 Pro Lys Ser Ser Gly Pro Tyr Gly Val Leu Val Tyr Leu His Gly Gly

GGT TTT GTA ATA GGC GAT GTG GAA TCT TAT GAC CCA TTA TGT AGA GCA
 Gly Phe Val Ile Gly Asp Val Glu Ser Tyr Asp Pro Leu Cys Arg Ala

ATT ACA AAT GCG TGC AAT TGC GTT GTA GTA TCA GTG GAC TAT AGG TTA
 Ile Thr Asn Ala Cys Asn Cys Val Val Val Ser Val Asp Tyr Arg Leu

GCT CCA GAA TAC AAG TTT CCT TCT GCA GTT ATC GAT TCA TTT GAC GCT
 Ala Pro Glu Tyr Lys Phe Pro Ser Ala Val Ile Asp Ser Phe Asp Ala

ACT AAT TGG GTT TAT AAC AAT TTA GAT AAA TTT GAT GGA AAG ATG GGA
 Thr Asn Trp Val Tyr Asn Asn Leu Asp Lys Phe Asp Gly Lys Met Gly

GTT GCG ATT GCG GGA GAT AGT GCT GGA GGA AAT TTG GCA GCG GTT GTA
 Val Ala Ile Ala Gly Asp Ser Ale Gly Gly Asn Leu Ala Ala Val Val

GCT CTT CTT TCA AAG GGT AAA ATT AAT TTG AAG TAT CAA ATA CTG GTT
 Ala Leu Leu Ser Lys Gly Lys Ile Asn Leu Lys Tyr Gln Ile Leu Val

TAC CCA GCG GTA AGT TTA GAT AAC GTT TCA AGA TCC ATG ATA GAG TAC
 Tyr Pro Ala Val Ser Leu Asp Asn Val Ser Arg Ser Met Ile Glu Tyr

TCT GAT GGG TTC TTC CTT ACC AGA GAG CAT ATA GAG TGG TTC GGT TCT
 Ser Asp Gly Phe Phe Leu Thr Arg Glu His Ile Glu Trp Phe Gly Ser

CAA TAC TTA CGA AGC CCT GCA GAT TTG CTA GAC TTT AGG TTC TCT CCA
 Gln Tyr Leu Arg Ser Pro Ala Asp Leu Leu Asp Phe Arg Phe Ser Pro

ATT CTG GCG CAA GAT TTC AAC GGA TTA CCT CCA GCC TTG ATA ATA ACA
Ile Leu Ala Gln Asp Phe Asn Gly Leu Pro Pro Ala Leu Ile Ile Thr

GCA GAA TAC GAT CCA CTA AGG GAT CAA GGA GAA GCG TAT GCA AAT AAA
Ala Glu Tyr Asp Pro Leu Arg Asp Gln Gly Glu Ala Tyr Ala Asn Lys

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CTA CTA CAA GCT GGA GTC TCA GTT ACT AGT GTG AGA TTT AAC AAC GTT
Leu Leu Gln Ala Gly Val Ser Val Thr Ser Val Arg Phe Asn Asn Val

ATA CAC GGA TTC CTC TCA TTC TTT CCG TTG ATG GAG CAA GGA AGA GAT
Ile His Gly Phe Leu Ser Phe Phe Pro Leu Met Glu Gln Gly Arg Asp

GCT ATA GGT CTG ATA GGG TCT GTG TTA AGA CGA GTA TTT TAT GAT AAA
Ala Ile Gly Leu Ile Gly Ser Val Leu Arg Arg Val Phe Tyr Asp Lys

ATT TAA
Ile

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Figure 11
LA11.1 Esterase es2

ATG AAG GTT AAA CAC GTT ATT GTT TTA CAT GGC TTA TAT ATG TCT GGC
Met Lys Val Lys His Val Ile Val Leu His Gly Leu Tyr Met Ser Gly
TTG GTG ATG CGC CCG TTA TGT TCG CGT CTA GAA GAG TCG GGG GTT AAA
Leu Val Met Arg Pro Leu Cys Ser Arg Leu Glu Glu Ser Gly Val Lys
GTT TTA AAC TTA ACC TAC AAT ACT CGA GAC CCT AAT CGA GAT GCT ATT
Val Leu Asn Leu Thr Tyr Asn Thr Arg Asp Pro Asn Arg Asp Ala Ile
TTT ACG CAA ATA GAT GAG TTT ATT AGC AAT GAG CCT TCT GCT TTA GTG
Phe Thr Gln Ile Asp Glu Phe Ile Ser Asn Glu Pro Ser Ala Leu Val
TGT CAC TCT ATG GGG GGC TTA GTT GCT CGC GCC TAT TTA GAG GCA AAC
Cys His Ser Met Gly Gly Leu Val Ala Arg Ala Tyr Leu Glu Ala Asn
TCA GCG CCA AGT CAT CAT GTT GAA AAG GTA ATC ACC TTA GGA ACG CCA
Ser Ala Pro Ser His His Val Glu Lys Val Ile Thr Leu Gly Thr Pro
CAT ACT GGC AGC CAT ATT GCT GAA AAA ATG CAG CAA AAA GGG TTC GAG
His Thr Gly Ser His Ile Ala Glu Lys Met Gln Gln Lys Gly Phe Glu
CTA TTA TTA AAA AAT AGC GTT GAG TTT TTA CTC TCT AAG AAT GGT GAT
Leu Leu Leu Lys Asn Ser Val Glu Phe Leu Leu Ser Lys Asn Gly Asp
TGG CCT TTT AAA GCC AAG CTA TAT AGC ATT GCC GGC GAC TTA CCG ATT
Trp Pro Phe Lys Ala Lys Leu Tyr Ser Ile Ala Gly Asp Leu Pro Ile
GGC TTA ATG CCA CTC ATT GTA AAA GGC AGC CGC TCT GAT GGC ACT GTA
Gly Leu Met Pro Leu Ile Val Lys Gly Ser Arg Ser Asp Gly Thr Val
TTG CTA GAT GAA ACC AAG CTA AAG GGT ATG GCT GAA CAC AAG GTG TTT
Leu Leu Asp Glu Thr Lys Leu Lys Gly Met Ala Glu His Lys Val Phe
CAT TTA AGC CAT ACA AGT ATG ATT TAC TCT CGC CAA GTC GTT AAT TAT
His Leu Ser His Thr Ser Met Ile Tyr Ser Arg Gln Val Val Asn Tyr
ATT CTT GAG CGC TTG AAC GAG GAC ATT TA
Ile Leu Glu Arg Leu Asn Glu Asp Ile

Figure 12
Whale Mat Sample 11.801 Esterase es9

ATG ATA AAA AAC TTC GAC AGA GAA AAT TCT AGC TTA GTA CTG TCC GGT
 Met Ile Lys Asn Phe Asp Arg Glu Asn Ser Ser Leu Val Leu Ser Gly
 GGT GGT GCT CTG GGT ATT GCT CAC TTG GGT GTA CTG CAT GAC CTT GAA
 Gly Gly Ala Leu Gly Ile Ala His Leu Gly Val Leu His Asp Leu Glu
 AAA CAA AAT ATT GTA CCA AAT GAA ATT GTT GGT ACA AGT ATG GGT GGT
 Lys Gln Asn Ile Val Pro Asn Glu Ile Val Gly Thr Ser Met Gly Gly
 ATC ATT GGT GCA TCT ATG GCT ATC GGG ATG AAA GAG AAA GAA ATA CTC
 Ile Ile Gly Ala Ser Met Ala Ile Gly Met Lys Glu Lys Glu Ile Leu
 GAA GAA ATC AAA AAC TTT TCC AAT GTC TTC AAC TGG ATA AAA TTC TCT
 Glu Glu Ile Lys Asn Phe Ser Asn Val Phe Asn Trp Ile Lys Phe Ser
 TTT TCC GGT AAT TCT GTT GTC GAT AAC GAG AAG ATC GCT AAG ATA TTT
 Phe Ser Gly Asn Ser Val Val Asp Asn Glu Lys Ile Ala Lys Ile Phe
 GAT ACT CTT TTT AAA GAC AGA AAG ATG ACA GAT ACG GTG ATC CCT CTT
 Asp Thr Leu Phe Lys Asp Arg Lys Met Thr Asp Thr Val Ile Pro Leu
 AAA CTC ATC GCT ACA AAC TTA CAT AAT GGA CAT AAA AAA GTA TTT ACT
 Lys Leu Ile Ala Thr Asn Leu His Asn Gly His Lys Lys Val Phe Thr
 GCT TCG GAT GAT GTA CTG ATC AAA GAT GCA ATA CTC TCA ACA ATG GCA
 Ala Ser Asp Asp Val Leu Ile Lys Asp Ala Ile Leu Ser Thr Met Ala
 ATA CCC GGT GTA TTT GAA GAA CAT ATT ATT GAT GGT GAA ACC TAT GGC
 Ile Pro Gly Val Phe Glu Glu His Ile Ile Asp Gly Glu Thr Tyr Gly
 GAC GGT TTT CTT TGT GAA AAC CTT GGT GTG AAT GAG GCA ACA TTC AAT
 Asp Gly Phe Leu Cys Glu Asn Leu Gly Val Asn Glu Ala Thr Phe Asn
 GAT GTT TTA GCT GTA GAT GTC ATG GGT GAG AAC TCT TTT GAA AAA GCA
 Asp Val Leu Ala Val Asp Val Met Gly Glu Asn Ser Phe Glu Lys Ala
 ATG CCG GAC AAC TTC TTT AAA ACA TCA AAT GTT TTA GAA ATG TTT GAA
 Met Pro Asp Asn Phe Phe Lys Thr Ser Asn Val Leu Glu Met Phe Glu
 AAA TCA ATG CGA CTT TTT ATT TAC AAC CAG ACA CAG ACA CAT ATT AAA
 Lys Ser Met Arg Leu Phe Ile Tyr Asn Gln Thr Gln Thr His Ile Lys
 AAT GCA AAT AAA AAT ATT TAT CTT ATT GAA CCC GTT ACC AAA GAG TAT
 Asn Ala Asn Lys Asn Ile Tyr Leu Ile Glu Pro Val Thr Lys Glu Tyr
 AAA ACA TTT CAA TTT CAT AAA CAT AAA GAG ATA CGT GCT TTA GGC TTG
 Lys Thr Phe Gln Phe His Lys His Lys Glu Ile Arg Ala Leu Gly Leu
 GGT TTA CTG TG
 Gly Leu Leu

Figure 13
Metallosphaera Prunae Ron 12/2 Esterase 23mc1

ATG CCC CTA CAT CCA AAG GTA AAG AAA TTA CTT TCC CAG CTA CCT CCC
Met Pro Leu His Pro Lys Val Lys Lys Leu Leu Ser Gln Leu Pro Pro
CAG GAC TTC TCC AGA AAC GTG CAG GAC CTG AGG AAG GCC TGG GAT TTA
Gln Asp Phe Ser Arg Asn Val Gln Asp Leu Arg Lys Ala Trp Asp Leu
CCC TTC TCA GGG AGG AGG GAG ACC CTG AAG AGG GTT GAG GAC CTT GAG
Pro Phe Ser Gly Arg Arg Glu Thr Leu Lys Arg Val Glu Asp Leu Glu
ATA CCC ACT AGG GAC GCA CGA ATC AGG GCC AGG GTC TAC ACC CCC TCA
Ile Pro Thr Arg Asp Ala Arg Ile Arg Ala Arg Val Tyr Thr Pro Ser
AGT AAG GAA AAC TTA CCC GTC CTT GTT TAC TAT CAC GGC GGT GGC TTC
Ser Lys Glu Asn Leu Pro Val Leu Val Tyr Tyr His Gly Gly Gly Phe
GTG TTC GGT AGC GTT GAC AGC TAC GAC GGC CTC GCA TCC CTT ATT GCC
Val Phe Gly Ser Val Asp Ser Tyr Asp Gly Leu Ala Ser Leu Ile Ala
AAG GAA TCT GGG ATT GCG GTT ATC TCC GTG GAG TAT AGG CTC GCC CCT
Lys Glu Ser Gly Ile Ala Val Ile Ser Val Glu Tyr Arg Leu Ala Pro
GAG CAC AAG TTC CCC ACC GCA GTC AAC GAC TCG TGG GAT GCG CTT CTC
Glu His Lys Phe Pro Thr Ala Val Asn Asp Ser Trp Asp Ala Leu Leu
TGG ATC GCG GAG AAC GGA GGC AAG CTG GGG CTC GAC ACC TCG AGA CTT
Trp Ile Ala Glu Asn Gly Gly Lys Leu Gly Leu Asp Thr Ser Arg Leu
GCC GTG GCT GGG GAT AGT GCT GGA GGA AAC CTG TCT GCC GTG GTG TCC
Ala Val Ala Gly Asp Ser Ala Gly Gly Asn Leu Ser Ala Val Val Ser
CTC CTG GAC AGG GAC CAG GGT AAG GGA CTG GTT AGT TAT CAG GTC CTA
Leu Leu Asp Arg Asp Gln Gly Lys Leu Val Ser Tyr Gln Val Leu
ATC TAC CCA GCA GTG AAC ATG GTC GAT AAC TCC CCA TCC GTC AGG GAG
Ile Tyr Pro Ala Val Asn Met Val Asp Asn Ser Pro Ser Val Arg Glu
TAC GGC GAG GGA TAC TTC CTC ACC AGG TCC ATG ATG AAC TGG TTC GGG
Tyr Gly Glu Gly Tyr Phe Leu Thr Arg Ser Met Met Asn Trp Phe Gly
ACC ATG TAC TTC TCC TCT GGA AGG GAA GCG GTA TCC CCC TAC GCC TCT
Thr Met Tyr Phe Ser Ser Gly Arg Glu Ala Val Ser Pro Tyr Ala Ser
CCA GCC TTG GCT GAC CTA CAT AAC CTC CCA CCC TCA CTG GTG ATC ACT
Pro Ala Leu Ala Asp Leu His Asn Leu Pro Pro Ser Leu Val Ile Thr
GCA GAG TAT GAT CCC CTA AGG GAT CAG GGA GAG ACC TAC TCT CAC TCC
Ala Glu Tyr Asp Pro Leu Arg Asp Gln Gly Glu Thr Tyr Ser His Ser

CTA AAC GAG GCT GGA AAC GTA TCA ACC TTG GTT AGA TAT CAA GGA ATG
Leu Asn Glu Ala Gly Asn Val Ser Thr Leu Val Arg Tyr Gln Gly Met

ATT CAC GGC TTC CTG TCC TTC TAC GAG TGG ATA ACT GCC GGT AAA CTA
Ile His Gly Phe Leu Ser Phe Tyr Glu Trp Ile Thr Ala Gly Lys Leu
GCC ATT CAC CAC ATT GCT GGG GTT CTG AGA TCT GTC CTT TA
Ala Ile His His Ile Ala Gly Val Leu Arg Ser Val Leu

Figure 14
Thermotoga neapolitana 5068 Esterase 56mc4

GTG GCC TTC TTC GAT ATG CCC CTT GAG GAA CTG AAA AAG TAC CGG CCT
 Val Ala Phe Phe Asp Met Pro Leu Glu Glu Leu Lys Lys Tyr Arg Pro
 GAA AGG TAC GAG GAG AAA GAT TTC GAT GAG TTC TGG AGG GAA ACA CTT
 Glu Arg Tyr Glu Glu Lys Asp Phe Asp Glu Phe Trp Arg Glu Thr Leu
 AAA GAA AGC GAA GGA TTC CCT CTG GAT CCC GTC TTT GAA AAG GTG GAC
 Lys Glu Ser Glu Gly Phe Pro Leu Asp Pro Val Phe Glu Lys Val Asp
 TTT CAT CTC AAA ACG GTT GAA ACG TAC GAT GTT ACT TTC TCT GGA TAC
 Phe His Leu Lys Thr Val Glu Thr Tyr Asp Val Thr Phe Ser Gly Tyr
 AGG GGG CAG AGA ATA AAG GGC TGG CTT CTT GTT CCG AAG TTG GCG GAA
 Arg Gly Gln Arg Ile Lys Gly Trp Leu Leu Val Pro Lys Leu Ala Glu
 GAA AAG CTT CCA TGC GTC GTG CAG TAC ATA GGT TAC AAT GGT GGA AGG
 Glu Lys Leu Pro Cys Val Val Gln Tyr Ile Gly Tyr Asn Gly Gly Arg
 GGT TTT CCA CAC GAC TGG CTG TTC TGG CCG TCA ATG GGT TAC ATC TGT
 Gly Phe Pro His Asp Trp Leu Phe Trp Pro Ser Met Gly Tyr Ile Cys
 TTT GTC ATG GAC ACC AGG GGG CAG GGA AGC GGC TGG ATG AAG GGA GAC
 Phe Val Met Asp Thr Arg Gly Gln Gly Ser Gly Trp Met Lys Gly Asp
 ACA CCG GAT TAC CCT GAG GGT CCA GTC GAT CCA CAG TAC CCC GGA TTC
 Thr Pro Asp Tyr Pro Glu Gly Pro Val Asp Pro Gln Tyr Pro Gly Phe
 ATG ACG AGG GGC ATT CTG GAT CCG GGA ACC TAT TAC TAC AGG CGA GTC
 Met Thr Arg Gly Ile Leu Asp Pro Gly Thr Tyr Tyr Tyr Arg Arg Val
 TTC GTG GAT GCG GTC AGG GCG GTG GAA GCA GCC ATT TCC TTC CCG AGA
 Phe Val Asp Ala Val Arg Ala Val Glu Ala Ala Ile Ser Phe Pro Arg
 GTG GAT TCC AGG AAG GTG GTG GTG GCC GGA GGC AGT CAG GGT GGG GGA
 Val Asp Ser Arg Lys Val Val Val Ala Gly Gly Ser Gln Gly Gly Gly
 ATC CCC CTT GCG GTG AGT GCC CTG TCG AAC AGG GTG AAG GCT CTG CTC
 Ile Pro Leu Ala Val Ser Ala Leu Ser Asn Arg Val Lys Ala Leu Leu
 TGC GAT GTG CCG TTT CTG TGC CAC TTC AGA AGG GCC GTG CAA CTT GTC
 Cys Asp Val Pro Phe Leu Cys His Phe Arg Arg Ala Val Gln Leu Val
 GAC ACA CAC CCA TAC GTG GAG ATC ACC AAC TTC CTC AAA ACC CAC AGG
 Asp Thr His Pro Tyr Val Glu Ile Thr Asn Phe Leu Lys Thr His Arg
 GAC AAA GAG GAG ATT GTT TTC AGA ACA CTT TCC TAC TTC GAT GGT GTG
 Asp Lys Glu Glu Ile Val Phe Arg Thr Leu Ser Tyr Phe Asp Gly Val

AAC TTT GCA GCA AGG GCA AAG GTG CCC GCC CTG TTT TCC GTT GGG CTC
 Asn Phe Ala Ala Arg Ala Lys Val Pro Ala Leu Phe Ser Val Gly Leu

ATG GAC ACC ATC TGT CCT CCC TCG ACG GTC TTC GCC GCT TAC AAC CAC
 Met Asp Thr Ile Cys Pro Pro Ser Thr Val Phe Ala Ala Tyr Asn His
 TAC GCC GGT CCA AAG GAG ATC AGA ATC TAT CCG TAC AAC AAC CAC GAA
 Tyr Ala Gly Pro Lys Glu Ile Arg Ile Tyr Pro Tyr Asn Asn His Glu
 GGT GGA GGT TCT TTC CAG GCA ATT GAG CAG GTG AAA TTC TTG AAG AGA
 Gly Gly Ser Phe Gln Ala Ile Glu Gln Val Lys Phe Leu Lys Arg
 CTA TTT GAG GAA GGC TAG

Leu Phe Glu Glu Gly

Leu Phe Glu Glu Gly

Figure 15
Melittangium lichenicola Esterase 77mc1

ATG CGC ACC CTC TCC TTC GGT CCG ATG ACC ACA GGG GGA AGC ATT CAC
 Met Arg Thr Leu Ser Phe Gly Pro Met Thr Thr Gly Gly Ser Ile His
 ATG GCG ACC ATG GAC GTG ATG CGC GGG CCG GGG ATG CAG CGG CTG TCA
 Met Ala Thr Met Asp Val Met Arg Gly Pro Gly Met Gln Arg Leu Ser
 CAG GGC GCC AGG GAG GCC GCG AAC CAC CCC TGG GCG AAG CGA CTG GGC
 Gln Gly Ala Arg Glu Ala Ala Asn His Pro Trp Ala Lys Arg Leu Gly
 CGC ATG GGC TAC GCG GCC AAG GGC GCC GTG TAC GCC ATC ATC GGC GTG
 Arg Met Gly Tyr Ala Ala Lys Gly Ala Val Tyr Ala Ile Ile Gly Val
 CTC GCG CTG AAG CTC GCG GCG GGC GAG GGC GGC CGG ACC ACG GAC AGC
 Leu Ala Leu Lys Leu Ala Ala Gly Glu Gly Gly Arg Thr Thr Asp Ser
 CAC GGC GCG GTG AAC ACC GTG GCG CAC GGG CCC TTC GGC GTC GCG CTG
 His Gly Ala Val Asn Thr Val Ala His Gly Pro Phe Gly Val Ala Leu
 CTG GCG GTG CTG GTG GGC CTG CTG GGC TAC GTG GTC TGG AGG TTC
 Leu Ala Val Leu Val Val Gly Leu Leu Gly Tyr Val Val Trp Arg Phe
 GCC CAG GCC TTC GTG GAC ACG GAG GAC AAG GGC TCC GAC GCG AAG GGA
 Ala Gln Ala Phe Val Asp Thr Glu Asp Lys Gly Ser Asp Ala Lys Gly
 ATC GCC ACG CGC GCC ATG TAC TTC CTC AGC GGC TGC ATC TAC GCG TCG
 Ile Ala Thr Arg Ala Met Tyr Phe Leu Ser Gly Cys Ile Tyr Ala Ser
 CTG GCC TTC GCC GCG CAG TCC CTG GTG GGC GCC GCG CAC GGC CGG
 Leu Ala Phe Phe Ala Ala Gln Ser Leu Val Gly Ala Ala His Gly Arg
 AGC AAG GGG ACG CAG GGC TGG ACG GCC ACG CTG ATG GAG CAG CCC TTT
 Ser Lys Gly Thr Gln Gly Trp Thr Ala Thr Leu Met Glu Gln Pro Phe
 GGC CGC GTG CTG GTG GCG CTG GTG GGG CTG GGC ATC GTG GGC TTC GCG
 Gly Arg Val Leu Val Ala Leu Val Gly Leu Gly Ile Val Gly Phe Ala
 CTG AAG CAG TTC CAC ACC GCG TGG AAG GCG AAG TTC CGG GAG AAG CTC
 Leu Lys Gln Phe His Thr Ala Trp Lys Ala Lys Phe Arg Glu Lys Leu
 ACC CTC ACC GGA CTG GCT GCC CGG AAG CAG CAC CAC ATC GAG CGC ATG
 Thr Leu Thr Gly Leu Ala Ala Arg Lys Gln His His Ile Glu Arg Met
 TGC CAG TTC GGC ATC GCC GCG CGC GGC GTG GTG TTC GCC GTC ATC GGC
 Cys Gln Phe Gly Ile Ala Ala Arg Gly Val Val Phe Ala Val Ile Gly
 GGC TTC CTC GTC CGC TCC GCC GTG GAC GCG AAC CCC GGC GAG GCC AAG
 Gly Phe Leu Val Arg Ser Ala Val Asp Ala Asn Pro Gly Glu Ala Lys

GGC CTG GGA GAG GCC CTG GCC GTC GTC GCG AGG CAG CCG TCC GGC GAC
 Gly Leu Gly Glu Ala Leu Ala Val Val Ala Arg Gln Pro Ser Gly Asp

GTG CTC CTG GGG GTG GTG GCG GCG GGC CTG GTG GCC TAC GCC GCC TAC
 Val Leu Leu Gly Val Val Ala Ala Gly Leu Val Ala Tyr Ala Ala Tyr
 CTG TTC CTC CAG GCG CGC TAC CGC GAA CTC TAG
 Leu Phe Leu Gln Ala Arg Tyr Arg Glu Leu

Figure 16
Whale Mat Sample 11.801 Esterase es2

ATG AGC AAA TTC GCA ATA CTC TGG GCG TTG ATA ACG GCA TAC CTG CCG
 Met Ser Lys Phe Ala Ile Leu Trp Ala Leu Ile Thr Ala Tyr Leu Pro
 GAA CCT GTG ATG AAA CTG GTA TAT TTA GGG CGG CGC GAA ACG CTT GGG
 Glu Pro Val Met Lys Leu Val Tyr Leu Gly Arg Arg Glu Thr Leu Gly
 GCA CGG ACG CTT GAC GTT AAA GCC CAA GCT GTC GGG CGG CTG GCC AAT
 Ala Arg Thr Leu Asp Val Lys Ala Gln Ala Val Gly Arg Leu Ala Asn
 GCA ACA AGA CCT GTC GGG GTG ATT CCG ACG GTC GAG GAA AGC CGG AAG
 Ala Thr Arg Pro Val Gly Val Ile Pro Thr Val Glu Glu Ser Arg Lys
 ATG ACG GAT AAA GCC GTT AGC CTT TTT GAT CAG CCC GCC CCC GAA TTA
 Met Thr Asp Lys Ala Val Ser Leu Phe Asp Gln Pro Ala Pro Glu Leu
 TTC CGT AAA AAA GAC ATT CAG ATT GAC GGG GCT GAA GGG CCT ATT GAT
 Phe Arg Lys Lys Asp Ile Gln Ile Asp Gly Ala Glu Gly Pro Ile Asp
 GCC CGT ATT TAC AGC GGC CCT GCA AAA CAT CGC CCR CGR CCA ATW CTA
 Ala Arg Ile Tyr Ser Gly Pro Ala Lys His Arg Pro Arg Pro Ile Leu
 GTG TAT TTT CAC GGC GGT GGC TGG GTT CAG GGC AAT CTG GAC AGC CAT
 Val Tyr Phe His Gly Gly Trp Val Gln Gly Asn Leu Asp Ser His
 GAC GGG GTT TGC GGC AAG CTG GCA AAA TGG GCG AAC TGC ATT GTT ATC
 Asp Gly Val Cys Gly Lys Leu Ala Lys Trp Ala Asn Cys Ile Val Ile
 TCG GTC GAT TAT CGT CTA GCG CCC GAA CAC AAA TTT CCT TGT GCG CCG
 Ser Val Asp Tyr Arg Leu Ala Pro Glu His Lys Phe Pro Cys Ala Pro
 CTT GAT GCG ATT GCG GCC TAT AAA TGG GTG CGC GCC AAC GCA ACA AAC
 Leu Asp Ala Ile Ala Ala Tyr Lys Trp Val Arg Ala Asn Ala Thr Asn
 CTT GGC GGC GAT CCT GAA CGT ATC GGC GTT GGC GGC GAT AGC GCA GGG
 Leu Gly Gly Asp Pro Glu Arg Ile Gly Val Gly Gly Asp Ser Ala Gly
 GGC AAT CTT GCC GCC GTT GTC TGC CAA CAA ACC GCC ATG AAC GGC GAG
 Gly Asn Leu Ala Ala Val Val Cys Gln Gln Thr Ala Met Asn Gly Glu
 CGC ACA CCA GAT CTG CAA GTC CTG ATC TAT CCG GCG CTG GAT GCA CGC
 Arg Thr Pro Asp Leu Gln Val Leu Ile Tyr Pro Ala Leu Asp Ala Arg
 ATG ATC TCG ACC TCG ATG GAG GAA TTG CGT GAT GCC TAC ATC TTG CCG
 Met Ile Ser Thr Ser Met Glu Glu Leu Arg Asp Ala Tyr Ile Leu Pro
 AAA TCC AGA ATG GAG TAT TTC CTC GGC CTA TAT ACG CGT GGC CCT GAC
 Lys Ser Arg Met Glu Tyr Phe Leu Gly Leu Tyr Thr Arg Gly Pro Asp

GAT ATC GAG GAC CTT AGG ATG TCG CCA ATT CTC AGG GAT ACC GTC GCG
 Asp Ile Glu Asp Leu Arg Met Ser Pro Ile Leu Arg Asp Thr Val Ala

GAT CAA CCC CAA GCC TGC ATT GTC ACC TGT GGG TTT GAC CCT GCG CGA
 Asp Gln Pro Gln Ala Cys Ile Val Thr Cys Gly Phe Asp Pro Ala Arg
 CGA CGG GAA CAC CTA CGC CGA ACG CTT AAT TGC CGA GGG GAT AGA CGT
 Arg Arg Glu His Leu Arg Arg Thr Leu Asn Cys Arg Gly Asp Arg Arg

Figure 17
Whale Mat Sample AD3059 Esterase es4

GTG AGC ATT CGT CTG CGA CTG TTA AAC TGG TTT TTG AAT ACC TTT GAA
 Val Ser Ile Arg Leu Arg Leu Leu Asn Trp Phe Leu Asn Thr Phe Glu
 AAA CCA AAA CTG GCC GCG GCC AAA ACG CCG GAT GAT TTG CGA AAA TCG
 Lys Pro Lys Leu Ala Ala Ala Lys Thr Pro Asp Asp Leu Arg Lys Ser
 TTT GAA TTA AAG GCG AGG TTT TTG TTT CCG GCG CCA CGT AAA ACA AGG
 Phe Glu Leu Lys Ala Arg Phe Leu Phe Pro Ala Pro Arg Lys Thr Arg
 TTT AGT CAT GAT GTA TTG CAG TCA GGC ATC GGG TCG GTA AAT GCC CAG
 Phe Ser His Asp Val Leu Gln Ser Gly Ile Gly Ser Val Asn Ala Gln
 TGG GCG AAA TCC AAA TCT GCA TCT GAT GAC AGG GTA ATC CTG TAT TTT
 Trp Ala Lys Ser Lys Ser Ala Ser Asp Asp Arg Val Ile Leu Tyr Phe
 CAT GGG GGA GGG TAT GTT TTT GGG TCA CCA AAA ACG CAC CGT GCA ATG
 His Gly Gly Gly Tyr Val Phe Gly Ser Pro Lys Thr His Arg Ala Met
 TTG GCG CGC TTG TCG GCA ATG ACA GGT CTT TCT GCG TGC CTT CCA GAT
 Leu Ala Arg Leu Ser Ala Met Thr Gly Leu Ser Ala Cys Leu Pro Asp
 TAT AGG TTG GCA CCA GAG CAC CCA TTT CCA GCC GCG ATC GAA GAT GCA
 Tyr Arg Leu Ala Pro Glu His Pro Phe Pro Ala Ala Ile Glu Asp Ala
 GTT TTA TCG TAT AAA TGT TTA CTA GAG CGA GCA ATC GAG CCC CAA AAT
 Val Leu Ser Tyr Lys Cys Leu Leu Glu Arg Ala Ile Glu Pro Gln Asn
 ATT ATA CTG GGG GGG GAC AGT GCT GGT GGC GGT TTG GTT CTT GCT TTG
 Ile Ile Leu Gly Gly Asp Ser Ala Gly Gly Leu Val Leu Ala Leu
 CTT GCA GAA ATC AAG GCC CAA TCC TTG CCC AAA CCT GCT GGC GTT TTT
 Leu Ala Glu Ile Lys Ala Gln Ser Leu Pro Lys Pro Ala Gly Val Phe
 GCC TTG TCG CCT TTG GTT GAT TTA TCA TTT TCG GGC CTT TCG TTT TCT
 Ala Leu Ser Pro Leu Val Asp Leu Ser Phe Ser Gly Leu Ser Phe Ser
 AAA AAT GCC CAA ACC GAT GTG ATG TTG CCC GCA TCA CGG GCT GCG GAT
 Lys Asn Ala Gln Thr Asp Val Met Leu Pro Ala Ser Arg Ala Ala Asp
 ATG GCG ACC TTG TAT TTG GAT GGG GCC GAT GCA GAT GAT CCA CGT GCA
 Met Ala Thr Leu Tyr Leu Asp Gly Ala Asp Ala Asp Asp Pro Arg Ala
 TCG CCG CTG CAG GCG GAT TTT TCT GGC ATG CCG CCT GTA TTT CTG ACA
 Ser Pro Leu Gln Ala Asp Phe Ser Gly Met Pro Pro Val Phe Leu Thr
 GCA AGT GAC AGT GAA ATC CTG TTG GAT GAT TGC CTG CGG ATG GCG GAT
 Ala Ser Asp Ser Glu Ile Leu Leu Asp Asp Cys Leu Arg Met Ala Asp

CAC TTG CGT GCG CAA GGT GTC GTT GTG ACA GAC CGG ATT GTT GAA AAC
 His Leu Arg Ala Gln Gly Val Val Val Thr Asp Arg Ile Val Glu Asn

 CAT CCA CAT GTT TGG CAT ATT TTT CAA CGC CTT CTA CCC GAA GCA GAT
 His Pro His Val Trp His Ile Phe Gln Arg Leu Leu Pro Glu Ala Asp
 CAG GGG CTG CGG GCG ATT GCC GCG TGG ATT AAA CCT CTT TTA TCA GGT
 Gln Gly Leu Arg Ala Ile Ala Ala Trp Ile Lys Pro Leu Leu Ser Gly
 TCA AAC GAA AGC TA
 Ser Asn Glu Ser

Figure 18
Microscilla furvescens Esterase 53sc2

ATG CTT ACA TTT AAT GTT TTA TAT GGT ATG ATG AAA CAA AAA CTA GCA
 Met Leu Thr Phe Asn Val Leu Tyr Gly Met Met Lys Gln Lys Leu Ala
 GCA ATT CTC ATG TTT TTA GGG CTA TCA GCA GCA GAG GCT CAA GAC TGG
 Ala Ile Leu Met Phe Leu Gly Leu Ser Ala Ala Glu Ala Gln Asp Trp
 CCT GAC CTA CAG AAA TAT CGT AGT GCT AAT AAA GAA GCC AAA TTA CTT
 Pro Asp Leu Gln Lys Tyr Arg Ser Ala Asn Lys Glu Ala Lys Leu Leu
 CCA AAG GAA AAC CGG AAG GTG GTT TTT ATG GGC AAC TCC ATT ACA GAA
 Pro Lys Glu Asn Arg Lys Val Val Phe Met Gly Asn Ser Ile Thr Glu
 GCC TGG ATT AGT CAG CGA CCT GAG TTT TTT AGT GAA AAT GGG TTT ATC
 Ala Trp Ile Ser Gln Arg Pro Glu Phe Phe Ser Glu Asn Gly Phe Ile
 GGT CGA GGC ATC AGT GGC CAG ACA ACC CCT CAG ATG TTG TTG AGA TTC
 Gly Arg Gly Ile Ser Gly Gln Thr Thr Pro Gln Met Leu Leu Arg Phe
 CGA CAG GAT GTG ATA GAC CTG CAG CCA AAG GCT GTA GTG ATA CTA GCT
 Arg Gln Asp Val Ile Asp Leu Gln Pro Lys Ala Val Val Ile Leu Ala
 GGT ACC AAT GAC GTA GCT CAA AAT ACC GGG CCG ATG ACC ATT GAG GAA
 Gly Thr Asn Asp Val Ala Gln Asn Thr Gly Pro Met Thr Ile Glu Glu
 TCG CTT GCT AAC ATT AAG TCT ATG GTG GAG CTG GCG CAA GCC AAT GGG
 Ser Leu Ala Asn Ile Lys Ser Met Val Glu Leu Ala Gln Ala Asn Gly
 ATC ACG CCT GTT TTG TGT ACC GTG CTG CCT GCA GAT CGT TTC AGC TGG
 Ile Thr Pro Val Leu Cys Thr Val Leu Pro Ala Asp Arg Phe Ser Trp
 CGA CCT GAG CTT ACA CCC GCA GAA ACT ATC ATT GCC CTC AAT CAG CTC
 Arg Pro Glu Leu Thr Pro Ala Glu Thr Ile Ile Ala Leu Asn Gln Leu
 ATT AAG CAA TAT GCC GAG GCA CAG GGC CTG GCC CTG GTG GAT TAT CAT
 Ile Lys Gln Tyr Ala Glu Ala Gln Gly Leu Ala Leu Val Asp Tyr His
 GCT GCA CTC ACC AAT AAA GGT GGA GGA CTT CCG GTG AAA TAC GGA GAA
 Ala Ala Leu Thr Asn Lys Gly Gly Leu Pro Val Lys Tyr Gly Glu
 GAT GGT GTG CAT CCA AAT GTA GCA GGC TAT CAG GTG ATG GAA AAC ATT
 Asp Gly Val His Pro Asn Val Ala Gly Tyr Gln Val Met Glu Asn Ile
 GTT TTA CCG GTC ATT TCC AGC GAG TTG GCA AAG CTG AAG TA
 Val Leu Pro Val Ile Ser Ser Glu Leu Ala Lys Leu Lys

Figure 19
Thermotoga maritima MSB8 Esterase 6scl

50 40 30 20 10 0
Met Ala Phe Phe Asp Leu Pro Leu Glu Glu Leu Lys Lys Tyr Arg Pro
GAG CGG TAC GAA GAG AAA GAC TTC GAT GAG TTC TGG GAA GAG ACA CTC
Glu Arg Tyr Glu Glu Lys Asp Phe Asp Glu Phe Trp Glu Glu Thr Leu
GCA GAG AGC GAA AAG TTC CCC TTA GAC CCC GTC TTC GAG AGG ATG GAG
Ala Glu Ser Glu Lys Phe Pro Leu Asp Pro Val Phe Glu Arg Met Glu
TCT CAC CTC AAA ACA GTC GAA GCG TAC GAT GTC ACC TTC TCC GGA TAC
Ser His Leu Lys Thr Val Glu Ala Tyr Asp Val Thr Phe Ser Gly Tyr
AGG GGA CAG AGG ATC AAA GGG TGG CTC CTT GTT CCA AAA CTG GAA GAA
Arg Gly Gln Arg Ile Lys Gly Trp Leu Leu Val Pro Lys Leu Glu Glu
GAA AAA CTT CCC TGC GTT GTG CAG TAC ATA GGA TAC AAC GGT GGA AGA
Glu Lys Leu Pro Cys Val Val Gln Tyr Ile Gly Tyr Asn Gly Gly Arg
GGA TTC CCT CAC GAC TGG CTG TTC TGG CCT TCT ATG GGT TAC ATA TGT
Gly Phe Pro His Asp Trp Leu Phe Trp Pro Ser Met Gly Tyr Ile Cys
TTC GTC ATG GAT ACT CGA GGT CAG GGA AGC GGC TGG CTG AAA GGA GAC
Phe Val Met Asp Thr Arg Gly Gln Gly Ser Gly Trp Leu Lys Gly Asp
ACA CCG GAT TAC CCT GAG GGT CCC GTT GAC CCT CAG TAT CCA GGA TTC
Thr Pro Asp Tyr Pro Glu Gly Pro Val Asp Pro Gln Tyr Pro Gly Phe
ATG ACA AGA GGA ATA CTG GAT CCC AGA ACT TAC TAC TAC AGA CGA GTC
Met Thr Arg Gly Ile Leu Asp Pro Arg Thr Tyr Tyr Tyr Arg Arg Val
TTC ACG GAC GCT GTC AGA GCC GTT GAA GCT GCT GCT TCT TTT CCT CAG
Phe Thr Asp Ala Val Arg Ala Val Glu Ala Ala Ala Ser Phe Pro Gln
GTA GAT CAA GAA AGA ATC GTG ATA GCT GGA GGC AGT CAG GGT GGC GGA
Val Asp Gln Glu Arg Ile Val Ile Ala Gly Gly Ser Gln Gly Gly Gly
ATA GCC CTT GCG GTG AGC GCT CTC TCA AAG AAA GCA AAG GCT CTT CTG
Ile Ala Leu Ala Val Ser Ala Leu Ser Lys Lys Ala Lys Ala Leu Leu
TGC GAT GTG CCG TTT CTG TGT CAC TTC AGA AGA GCA GTA CAG CTT GTG
Cys Asp Val Pro Phe Leu Cys His Phe Arg Arg Ala Val Gln Leu Val
GAT ACG CAT CCA TAC GCG GAG ATC ACG AAC TTT CTA AAG ACC CAC AGA
Asp Thr His Pro Tyr Ala Glu Ile Thr Asn Phe Leu Lys Thr His Arg
GAC AAG GAA GAA ATC GTG TTC AGG ACT CTT TCC TAT TTC GAT GGA GTG
Asp Lys Glu Glu Ile Val Phe Arg Thr Leu Ser Tyr Phe Asp Gly Val

AAC TTC GCA GCC AGA GCG AAG ATC CCT GCG CTG TTT TCT GTG GGT CTC
Asn Phe Ala Ala Arg Ala Lys Ile Pro Ala Leu Phe Ser Val Gly Leu

ATG GAC AAC ATT TGT CCT CCT TCA ACG GTT TTC GCT GCC TAC AAT TAC
Met Asp Asn Ile Cys Pro Pro Ser Thr Val Phe Ala Ala Tyr Asn Tyr
TAC GCT GGA CCG AAG GAA ATC AGA ATC TAT CCG TAC AAC AAC CAC GAG
Tyr Ala Gly Pro Lys Glu Ile Arg Ile Tyr Pro Tyr Asn Asn His Glu
GGA GGA GGC TCT TTC CAA GCG GTT GAA CAG GTG AAA TTC TTG AAA AAA
Gly Gly Gly Ser Phe Gln Ala Val Glu Gln Val Lys Phe Leu Lys Lys
CTA TTT GAG AAA GGC TAA

Leu Phe Glu Lys Gly

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Figure 20
Polyangium brachysporum Esterase 78mc1

TTG AAG TAC TTC AAA GCC CGG CTT GCC GGC ATC ACC TTG CTC GGC CTG
 Leu Lys Tyr Phe Lys Ala Arg Leu Ala Gly Ile Thr Leu Leu Gly Leu
 CTG GCC TGC ACC TCG GCC TCG GCG CAG ACC GAG CCC ATC GTG TTC GTG
 Leu Ala Cys Thr Ser Ala Ser Ala Gln Thr Glu Pro Ile Val Phe Val
 CAC GGC TAT TCC GGC AGC GCA TCC AAC TGG GAC ACC ATG CTG GGC CGC
 His Gly Tyr Ser Gly Ser Ala Ser Asn Trp Asp Thr Met Leu Gly Arg
 TTC CGG TCG AAC GGT TAT GCG TCC GGC TCG CTC TAC ACC TTC AAC TAC
 Phe Arg Ser Asn Gly Tyr Ala Ser Gly Ser Leu Tyr Thr Phe Asn Tyr
 AAC TCG TTG GTC AGC AGC AAC CGC ACC AGC GCC AGC GAG CTG CGC AGC
 Asn Ser Leu Val Ser Ser Asn Arg Thr Ser Ala Ser Glu Leu Arg Ser
 TTC GTC AAC ACC GTG CGT TCG CGC CAC GGC AAC GCC CGC ATC GCG CTG
 Phe Val Asn Thr Val Arg Ser Arg His Gly Asn Ala Arg Ile Ala Leu
 GTC GCC CAC TCC AAC GGC GGG CTG GTG TCG CGC TGG TAT CGC GCG GAG
 Val Ala His Ser Asn Gly Gly Leu Val Ser Arg Trp Tyr Arg Ala Glu
 CTG GGC GGC GAA ACG GCC ACC CGC CGC TTC GTG ACG CTG GGC ACG CCG
 Leu Gly Gly Glu Thr Ala Thr Arg Arg Phe Val Thr Leu Gly Thr Pro
 CAC CGG GGC ACC ACC TGG GCC TAT GCG TGC TAC AGC CCC GCA TGT TTC
 His Arg Gly Thr Thr Trp Ala Tyr Ala Cys Tyr Ser Pro Ala Cys Phe
 GAG ATG CGC CCC GGC TCC AGC TTG CTG ACC ACG CTG GGC TCG CGT GCC
 Glu Met Arg Pro Gly Ser Ser Leu Leu Thr Thr Leu Gly Ser Arg Ala
 TGC GAC CGC TCG CTG TGG TCG AAC ACC GAC GGC ATC ATC CTG CCG GCG
 Cys Asp Arg Ser Leu Trp Ser Asn Thr Asp Gly Ile Ile Leu Pro Ala
 TCC AGC GCG CAG TGT GGT GTC AGC ACG CGC ACT GCC GAC GTC AGC CAT
 Ser Ser Ala Gln Cys Gly Val Ser Thr Arg Thr Ala Asp Val Ser His
 CTC GAC CTG CTG ACC GAC TCT CGC GTG TAC ACG CAG TTG CGC ACG CAG
 Leu Asp Leu Leu Thr Asp Ser Arg Val Tyr Thr Gln Leu Arg Thr Gln
 TTG CAA TGA GGG TGA CGG TGC ACC GAA CGT GCA CCT G
 Leu Gln End Gly End Arg Cys Thr Glu Arg Ala Pro